



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-253X

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO., LTD

Block A 3rd Floor No.4 Building, Tian'an Cyber Park, Huangge Rd, LongGang Dist, Shenzhen, GD

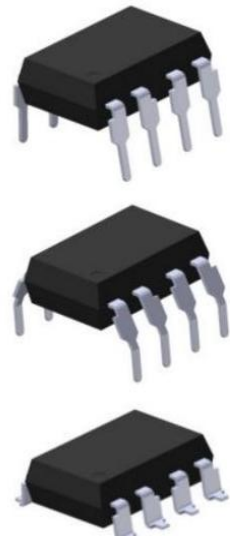
TEL: 0755-29681816

FAX: 0755-29681200

www.orient-opto.com

1. Features

- (1) High speed 1 MBd
- (2) Guaranteed performance from -40 to 105°C
- (3) Open collector output
- (4) High isolation voltage between input and output
- (5) Sasrty approval
 - VDE approved (No.40029733)
 - CQC approved (No.CQC19001231254)
- (6) In compliance with RoHS, REACH standards
- (7) MSL Class I



2. Instructions

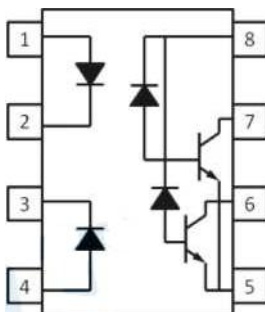
The OR-2530 and OR-2531 dual channel devices each consist of an infrared emitting diode, optically coupled to a high speed photo detector transistor. A separate connection for the photodiode bias and output-transistor collector increase the speed by several orders of magnitude over conventional phototransistor couplers by reducing the base-collector capacitance of the input transistor. The devices are packaged in an 8-pin DIP package and available in wide-lead spacing and SMD option.

The photoelectric coupler operating temperature range: -40 °C to 105 °C.

3. Application Range

- (1) Line receivers
- (2) Telecommunication equipments
- (3) Feedback loop in switch-mode power supplies
- (4) Home appliances
- (5) High speed logic ground isolation
- (6) Power transistor isolation in motor drives
- (7) Replacement for low speed phototransistor photo couplers

4. Functional Diagram



Pin Configuration

1. Anode
2. Cathode
3. Cathode
4. Anode
5. Gnd
6. Vout 2
7. Vout 1
8. Vcc

Truth table(Positive Logic)	
Input	Output
H	L
L	H

5. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
INPUT	Forward Current	I_F	25	mA
	Peak forward Current (50% duty, 1ms P.W)	I_{FP}	50	mA
	Peak transient Current (1<lps P.W,300pps)	$I_{F(trans)}$	1	A
	Reverse Voltage	V_R	5	V
	Power Dissipation	P_I	40	mW
OUTPUT	Power Dissipation	P_O	35	mW
	Average Output Current	$I_{O(AVG)}$	8	mA
	Output Peak Output Current	$I_{O(PK)}$	16	mA
	Output Voltage	V_O	-0.5 to 20	V
	Supply Voltage	V_{CC}	-0.5 to 30	V
Isolation Voltage *1		V_{ISO}	5000	Vrms
Operating Temperature		T_{OPR}	-40 to 105	°C
Storage Temperature		T_{STG}	-55 to 125	°C
Soldering Temperature *2		T_{SOL}	260	°C

Notes:

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1,2, 3 & 4 are shorted together, and pins 5, 6, 7 & 8 are shorted together.

*2 For 10 seconds.

6. Electrical Characteristics (at T_A = 25°C)

Parameter			Symbol	Min	Typ	Max	Unit	Condition
Input	Forward Voltage		V _F	—	1.4	1.8	V	I _F =16mA, T _A =25°C
	Reverse Voltage		V _R	5.0	—	—	V	I _R = 10μA
	Temperature coefficient of Forward Voltage		ΔV _F /ΔT _A	—	-0.9	—	mV/°C	I _R = 16mA
	Input Capacitance		C _{in}	—	60	—	pF	V _F =0V, f=1MHz
Detector	High Level Supply Current		I _{CC} H	—	0.01	1	μA	I _F =0mA, V _O =Open, V _{CC} =15V
	Low Level Supply Current		I _{CC} L	—	140	400	μA	I _F =16mA, V _O =OPEN, V _{CC} =15V
	High Level Output Current		I _{OH}	—	0.001	0.5	μA	I _F =0mA, V _O =V _{CC} =5.5V
				—	—	50		I _F =0mA, V _O =V _{CC} =15V
	Current Transfer Ratio	OR-2530	CTR	7	—	50	%	I _F =16mA ,V _O =0.4V, V _{CC} =4.5V
		OR-2531		19	—	50		
		OR-2530		5	—	—		I _F =16mA ,V _O =0.5V, V _{CC} =4.5V
		OR-2531		15	—	—		
	Logic Low Output Voltage	OR-2530	V _{OL}	—	0.18	0.5	V	I _F =16mA I _O =1.1mA, V _{CC} =4.5V
		OR-2531		—	0.25	0.5		I _F = 16mA I _O =3mA, V _{CC} =4.5V
		OR-2530		—	—	0.5		I _F =16mA I _O =0.8mA, V _{CC} =4.5V
		OR-2531		—	—	0.5		I _F =16mA I _O =2.4mA, V _{CC} =4.5V

7. Switching Characteristics (at T_A = 25°C)

Parameter	Symbol	Min.	Typ*	Max.	Unit	Conditions
Propagation Delay Time to Logic Low	t _{PHL}	—	0.39	0.8	μs	R _I =1.9KΩ I _F =16mA
Propagation Delay Time to Logic High	t _{PLH}	—	0.65	0.8	μs	R _I =1.9KΩ I _F =16mA

8. Order Information

Part Number

OR-253XU-Y-Z

Note

253X = Part Number ,2530 or 2531.

U = Lead form option (S, M or none)

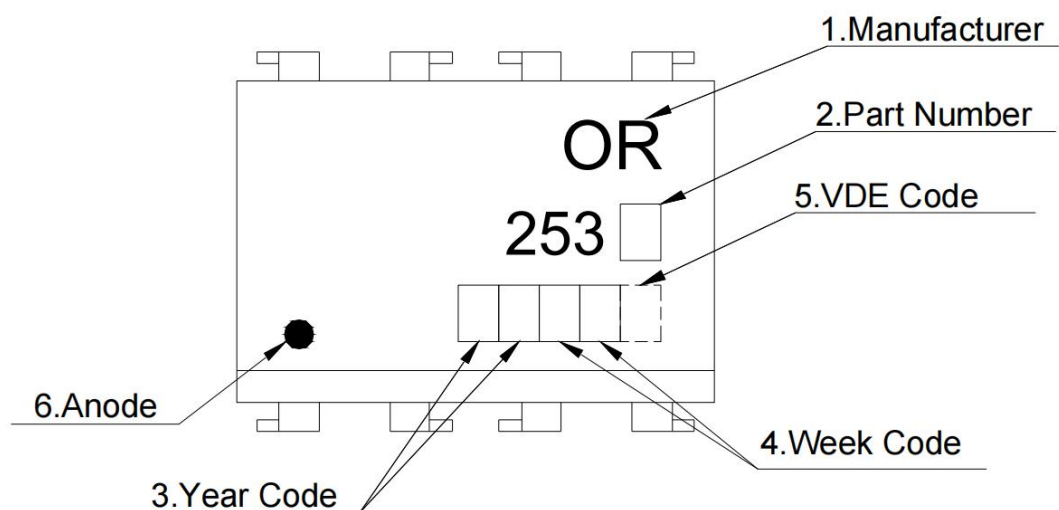
Y = Tape and reel option (TA,TA1 or none).

Z = 'V' code for VDE safety (This options is not necessary).

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard SMD Option	45 units per tube
M	Wide lead bend (0.4 inch spacing)	45 units per tube
TA	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
TA1	Surface mount lead form (low profile) + TA1 tape & reel option	1000 units per reel

9. Naming Rule

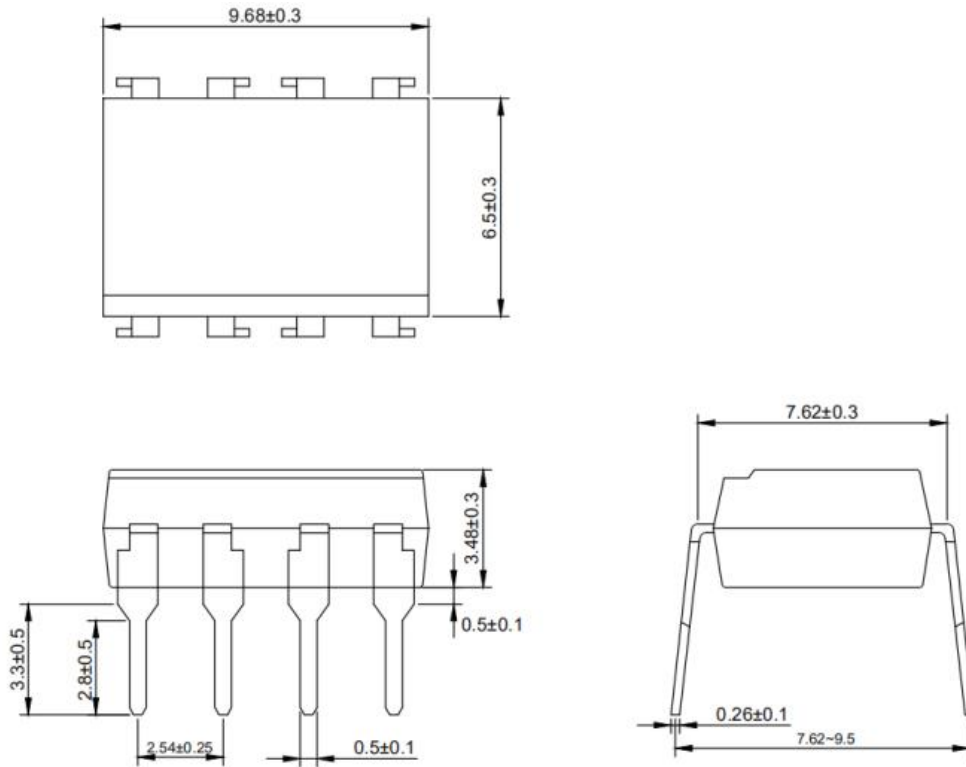


1. Manufacturer : ORIENT.
2. Part Number : 2530 or 2531.
3. Year Code : '21' means '2021' and so on.
4. Week Code : 01 means the first week, 02 means the second week and so on.
5. VDE Code . (Optional)
6. Anode.

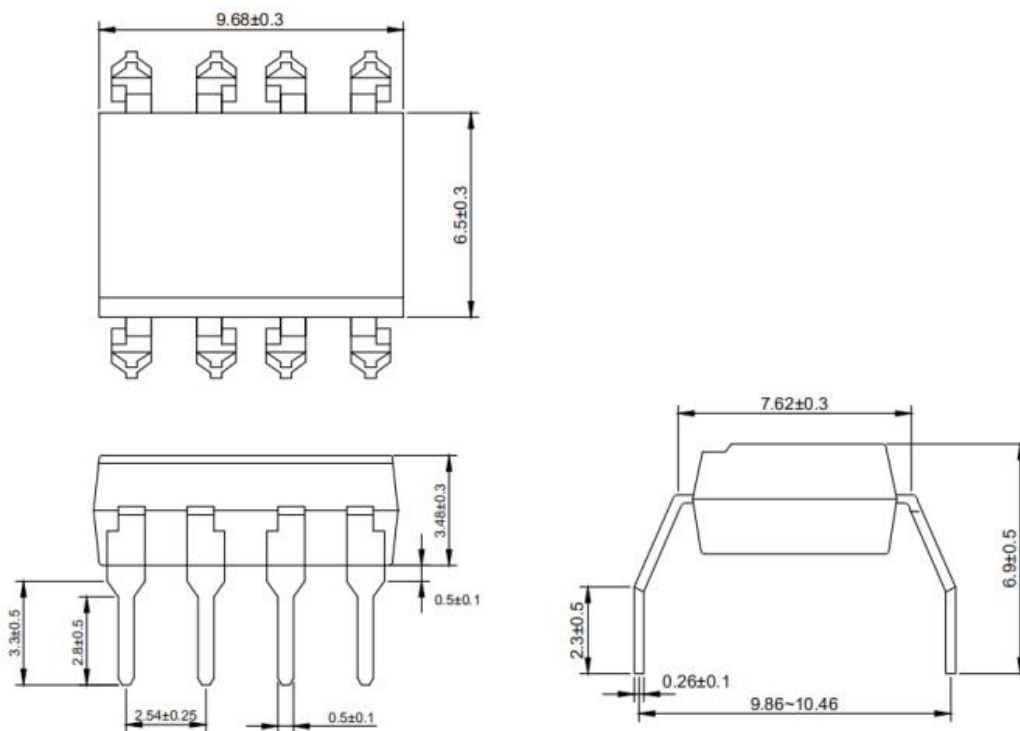
* VDE Mark can be selected.

10. Outer Dimension

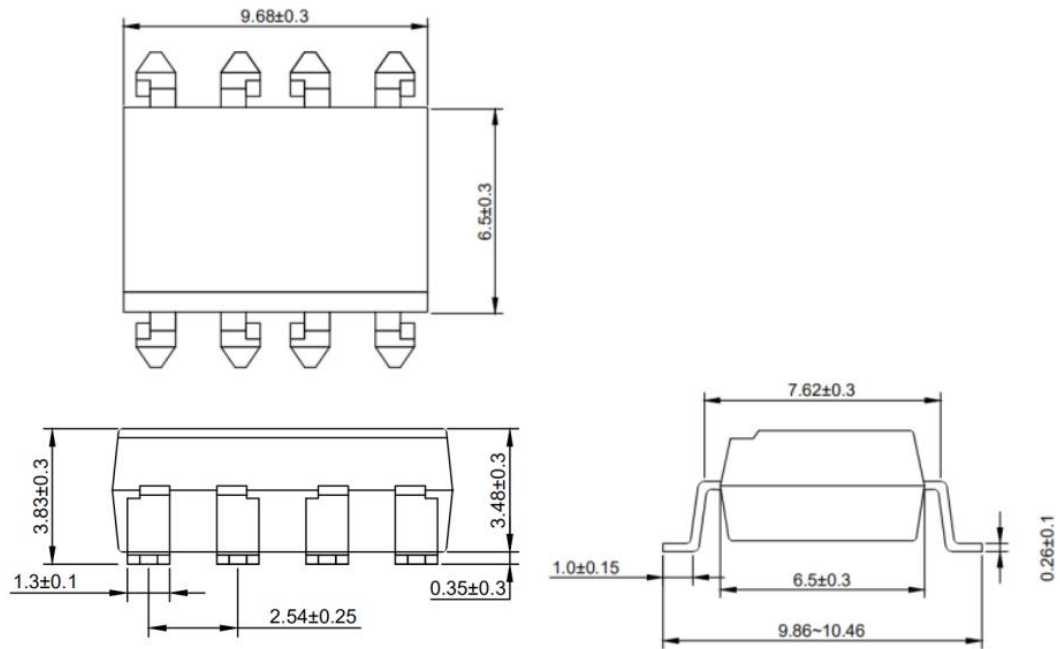
(1) OR-253X



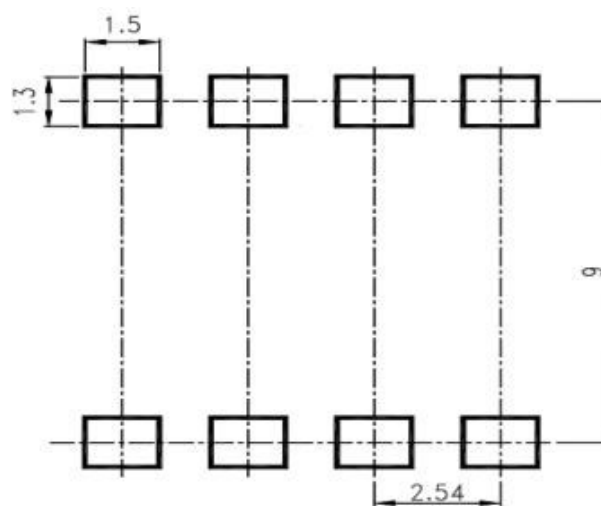
(2) OR-253XM



(3) OR-253XS



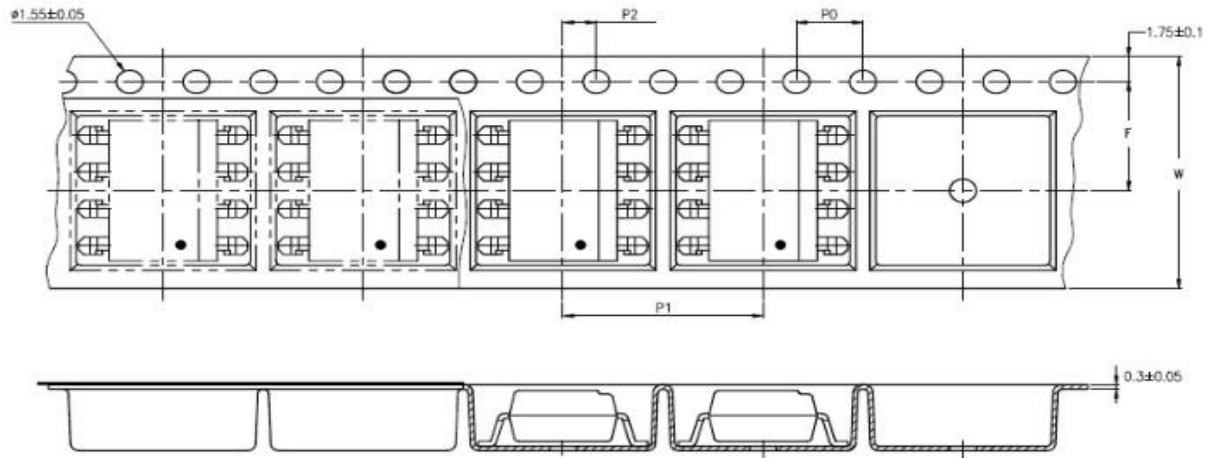
11. Recommended Foot Print Patterns (Mount Pad)



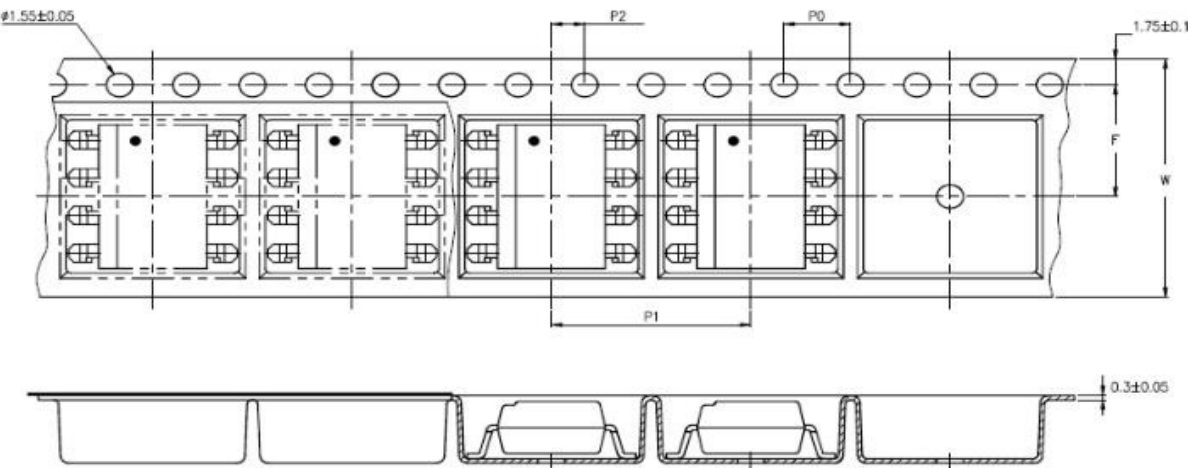
unit: mm

12. Taping Dimensions

(1) OR-253XS-TA



(2) OR-253XS-TA1



type	symbol	Size: mm (inches)
bandwidth	W	16 ± 0.3 (0.63)
pitch	P_0	4 ± 0.1 (0.15)
pitch	F	7.5 ± 0.1 (0.295)
	P_2	2 ± 0.1 (0.079)
interval	P_1	12 ± 0.1 (0.472)

Encapsulation type	TA/TA1
amount (pcs)	1000

13. Package Dimension

(1) package dimension

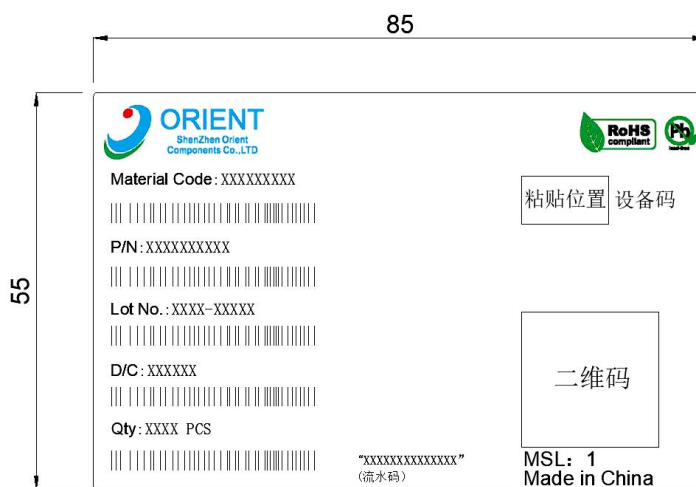
DIP Type

Packing Information	
Packing type	Tube
Qty per Tube	45pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	2,250pcs
The Amount per Outer Box	22,500pcs

SOP Type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	1,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	2,000pcs
Max qty per large box	20,000pcs

(2)Packing Label Sample



Note:

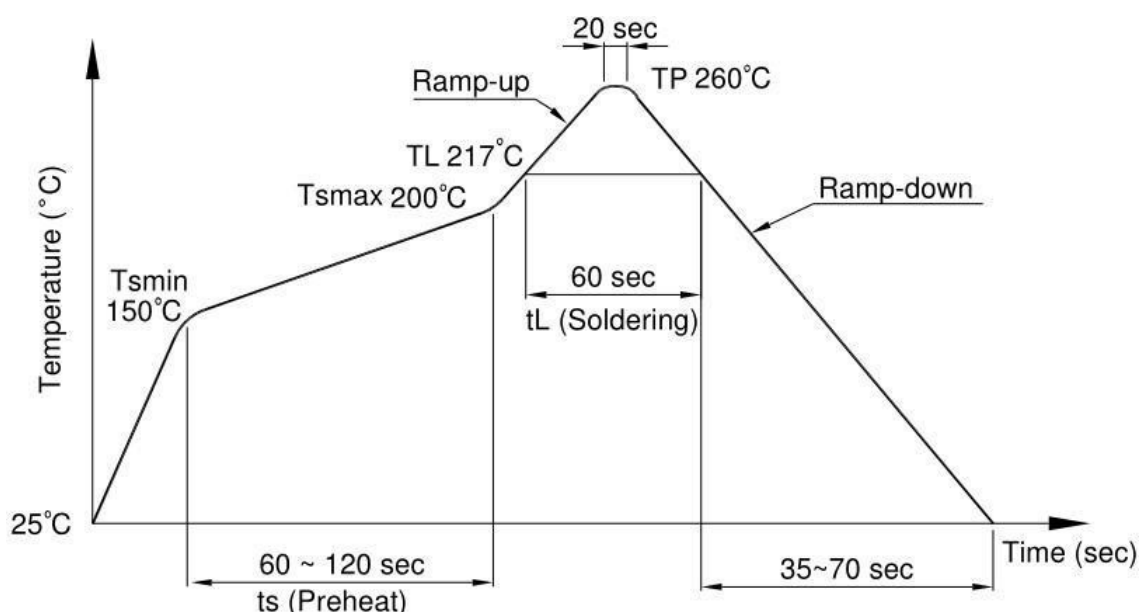
Material Code :Product ID.
P/N :Contents with "Order Information" in the specification.
Lot No. :Product weeks.
D/C :Product data.
Quantity :Packaging quantity.

14. Temperature Profile Of Soldering

(1) IR Reflow soldering (JEDEC-STD-020 compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

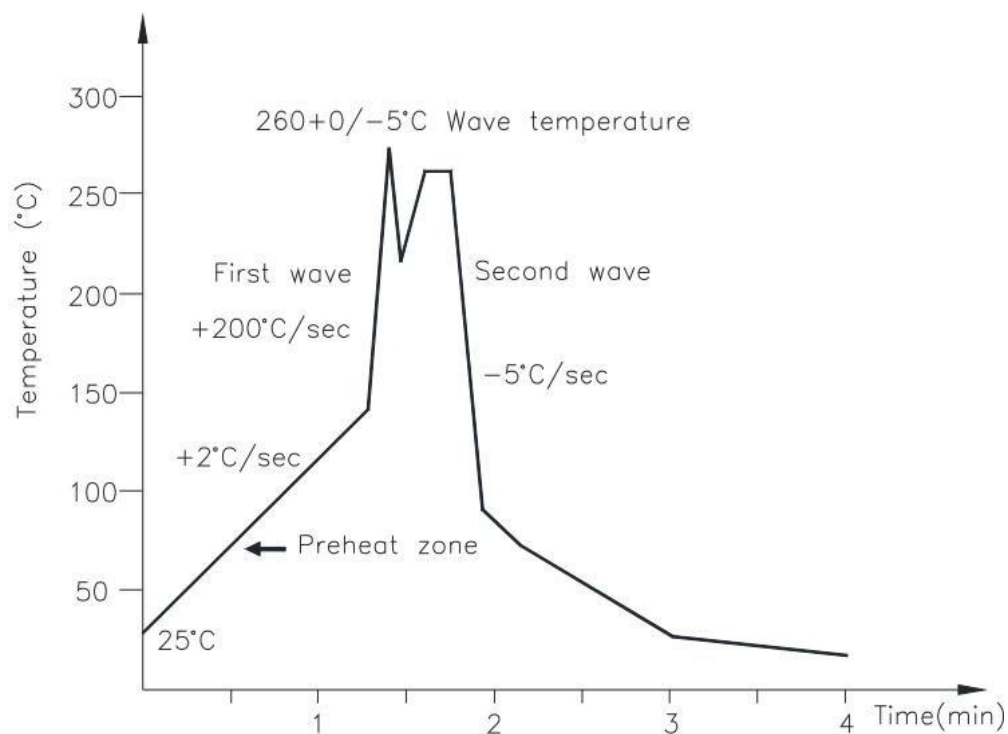
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature	3~6°C / sec
Reflow times	≤3



(2) Wave soldering (JEDEC22A111 compliant)

One-time welding is recommended under the temperature condition.

Temperature	260+0/-5°C
Time	10 sec
Preheat temperature	5 to 140°C
Preheat time	30 to 80 sec



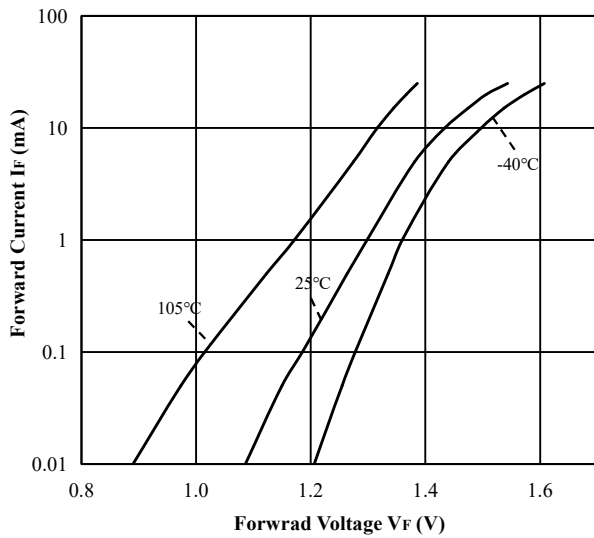
(3) Hand soldering by soldering iron

Single lead welding is allowed in each process and one-time welding is recommended.

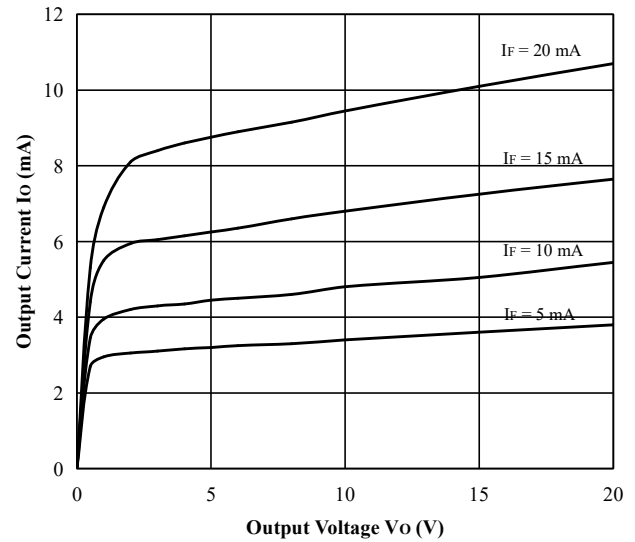
Temperature	380+0/-5°C
Time	3 sec max

15. Characteristics Curve

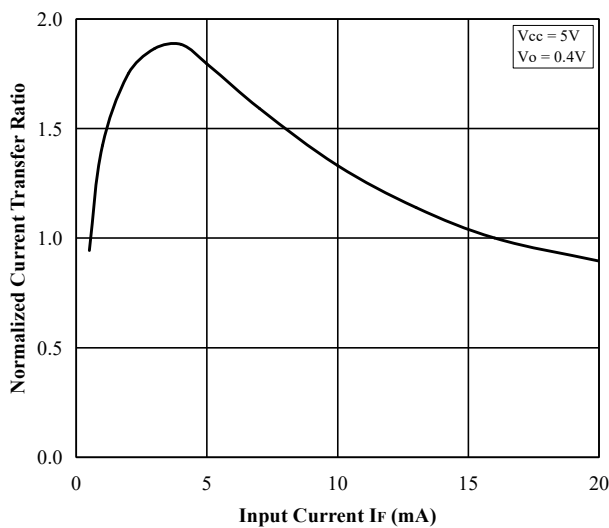
FORWARD CURRENT vs. FORWARD VOLTAGE



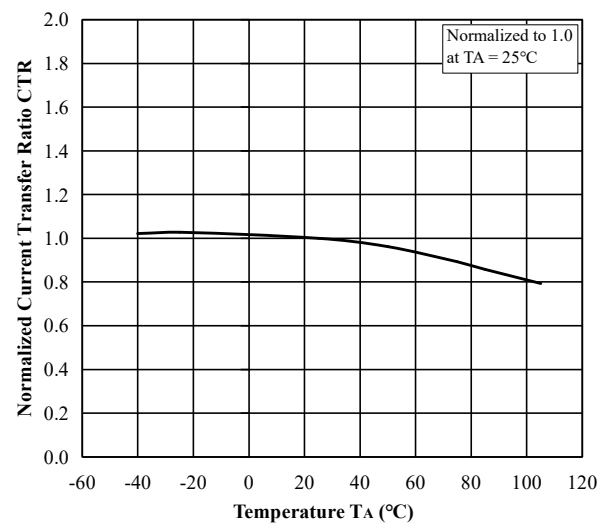
OUTPUT CURRENT vs. OUTPUT VOLTAGE



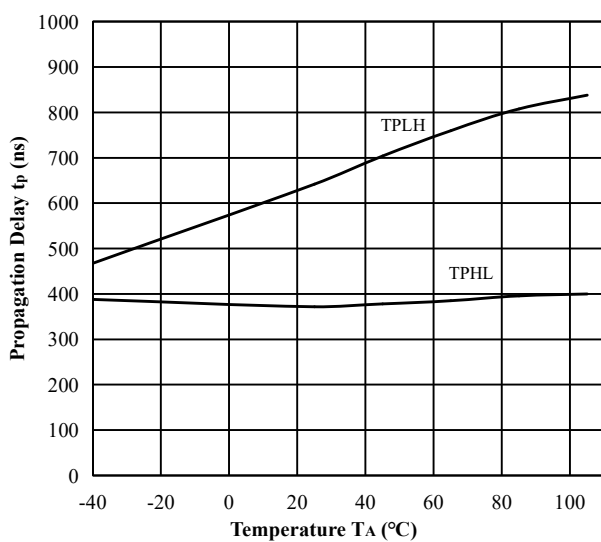
CURRENT TRANSFER RATIO vs. INPUT CURRENT



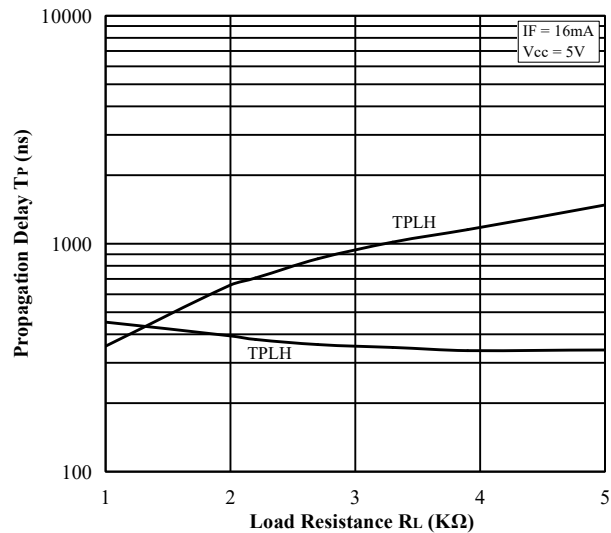
CURRENT TRANSFER RATIO vs. TEMPERATURE



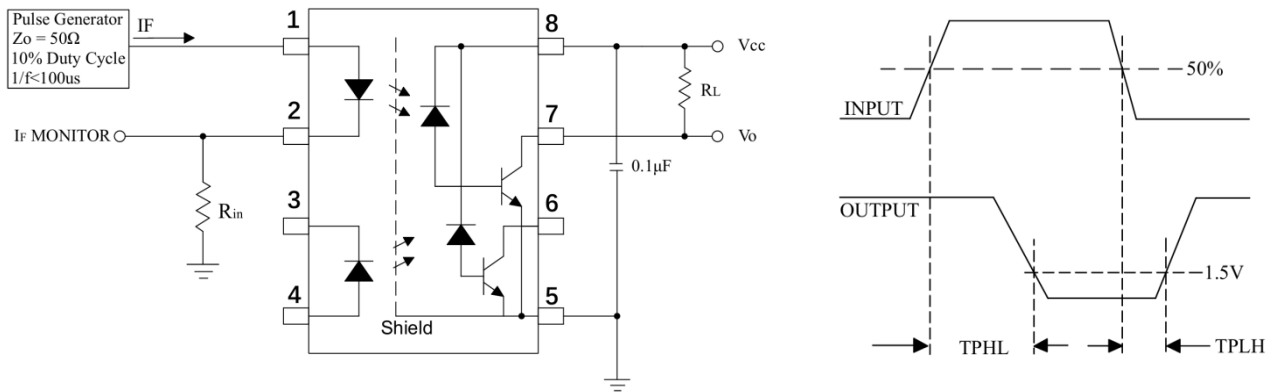
PROPAGATION DELAY TIME vs. TEMPERATURE



PROPAGATION DELAY vs. LOAD RESISTANCE



16. Switching Time Test Circuit



Switching Time Test Circuit & Waveform

17. Notes

- (1) Orient is continually improving the quality, reliability, function or design and Orient reserves the right to make changes without further notices.
- (2) The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- (3) For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- (4) When requiring a device for any “specific” application, please contact our sales in advice.
- (5) If there are any questions about the contents of this publication, please contact us at your convenience.
- (6) The contents described herein are subject to change without prior notice.
- (7) Immerge unit’s body in solder paste is not recommended.